REMARKS

Section A summarizes the status of the claims. Sections B through D respond to the 35 USC 102 and 103 rejections and the objections of the Office Action of June 14, 2005 in the order in which they appeared in the Action.

A. Status of Claims

Claims 1-24 and 34-67 are pending in the application. Claims 13-24 and 34-67 are withdrawn from consideration. Claims 1-6 and 8-10 were rejected under 35 USC 102(a) as being anticipated by Lee et al., US Patent Application No. 09/927648 and what the Examiner refers to as Admitted Prior Art (APA). Claim 7 was objected to. Claims 11-12 were rejected under 35 USC 103(a) as being unpatentable over Lee et al. and APA in view of Li et al., US Patent No. 6,627,530.

B. Rejections, 35 USC 102(a): Claims 1-6 and 8-10

Claim 1 recites a method of forming an active device, the method comprising: performing a first patterning operation on a first plurality of layers, the first patterning operation defining a first feature of the active device; and performing a second patterning operation on at least one patterned layer of the first plurality of layers, the second patterning operation defining a second feature of the active device, wherein the first and second patterning operations are performed substantially back-to-back.

Applicants point out that the claim recites that the two patterning steps "are performed substantially back-to-back." As described in the specification of the present invention, the term "back-to-back" specifically means that the second patterning operation is performed immediately after the first, *without the interposition of a dielectric fill step*. A purpose of the present invention is to prevent the unintended formation of

PAGE 12/20 * RCVD AT 8/23/2005 7:26:59 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-6/27 * DNIS:2738300 * CSID:408 969 4849 * DURATION (mm-ss):04-50

conductive "stringers" which provide unwanted electrical connections between adjacent pillars. The stringers are formed when conductive material is trapped underneath overhanging dielectric fill during the second etch. In the present invention, by forming the pillars in two back-to-back patterning steps, with no dielectric fill deposited between the patterning steps, no stringers can be formed.

The Examiner points to paragraph [0141] and Figs. 9a and 9b of Lee et al.:

> Alternatively, as shown in FIGS. 9A and 9B, a pillar can be formed by the intersection of the patterning of the first and second I/O's. For example, a pillar can be formed by first blanket depositing a first I/O conductor 900 followed by the sequential blanket deposition of the film stack 902 (e.g., N+/P-/N+) of the desired pillar. The first I/O film 900 and the pillar film stack 902 are then etched to form a plurality of pillar strips 904 as shown in FIG. 9a. During subsequent processing to pattern the second I/O, the second I/O 906 is etched in a direction perpendicular or orthogonal to the plurality of strips 904. The etch step used to pattern the second I/O 906 is continued so as to etch away the pillar film stack 902 from the portions of the strip 904 which are not covered or masked by the second I/O 906. In this way, a pillar 908 is formed at the intersection of the first and second I/O's. The pillar 908 is formed in direct alignment with the intersection or overlap of the first and second I/O's. The intersection technique of forming a pillar is advantageous because it saves additional lithography steps.

In the procedure described in this paragraph, the first patterning step forms pillar strips 904, shown in Fig. 9a, which include semiconductor stack 902 and first conductor 900. A second patterning step, orthogonal to the first, forms the top conductor ("second I/O") 906 and continues through semiconductor stack 902, forming pillars 908 shown in Fig. 9b. The Examiner considers these two patterning steps to be back-to-back.

It would be clear to one skilled in the art of photolithography and etch, however, that these steps *cannot* be back-to-back.

Declaration under 37 CFR 1.132: Etches of Fig. 9a and 9b not back-to-back

Included with this correspondence is a declaration under 37 CFR 1.132 by James M. Cleeves, an inventor of Lee et al., attesting that the two etch steps are not performed

PAGE 13/20 * RCVD AT 8/23/2005 7:26:59 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-6/27 * DNIS:2738300 * CSID:408 969 4849 * DURATION (mm-ss):04-50

back-to-back. and that a dielectric fill step (along with a planarization step and another deposition step) are performed between them, and thus that these steps are not performed back-to-back.

Etch step cannot be back-to-back

As described in the specification of the instant application, and as is well known in the art, it is conventional, after a pattern-and-etch step, to deposit dielectric fill to fill the gaps between the just-patterned features, providing structural support to those patterned features and for layers to be deposited in later steps.

Fig. 9a of Lee et al. shows the structure after a first patterning step, when strip 904 has been formed. Fig. 9a of Lee et al. is a perspective view. Fig. 1 of the Appendix of this Response shows the same structure in a cross sectional view. In the view of Fig. 1, the long dimension of strip 904 extends out of the page.

Fig. 9b of Lee et al. shows the structure after (as Applicants will show) a dielectric fill step, a step to deposit conductor material which will form top conductor 906, and a pattern and etch step forming top conductor 906.

Fig. 2 of the Appendix shows the structure of Fig. 9b (a perspective view) in cross-section, in the same view as Fig. 1. Fig. 9b of Lee et al. shows the top conductor 906 extending, apparently unsupported, into space atop pillar 908, perpendicular to bottom conductor 900. In reality top conductor 906 is supported by dielectric fill, as shown in Fig. 2. If no dielectric fill step had been performed after the patterning step to form strip 904, top conductor 906 would have nothing to support it, and would have the form shown in Fig. 3 of the Appendix. As noted, it is conventional to perform a dielectric fill step following a patterning step to provide such support. It is also

PAGE 14/20 * RCVD AT 8/23/2005 7:26:59 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-6/27 * DNIS:2738300 * CSID:408 969 4849 * DURATION (mm-ss):04-50

conventional to omit dielectric fill in perspective views, as it would obscure the active devices. which are generally of interest.

Applicants concede that no dielectric fill step is *explicitly* listed in the description of paragraph [0141] of Lee et al.; this step is so conventional as to have been omitted from the description, along with other conventional cleaning steps that were likely performed. But the only reasonable explanation for the shape of top conductor 906 is the presence of dielectric fill, supporting it from beneath, and one skilled in the art would assume its presence. A dielectric fill step was necessarily performed between the two patterning steps of Lee et al. described in paragraph [0141], and thus these two patterning steps are not back-to-back.

Thus claim 1 and its dependent claims 2-13 distinguish over the cited art. Reconsideration is respectfully requested.

C. Objections: Claim 7

Claim 7 was objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form. Applicants appreciate the indication of allowable subject matter.

D. Rejections, 35 USC 103(a): Claims 11-12

Claims 11 and 12 depend from claim 1, and thus distinguish over the cited art for the reasons described in Section B in the response to the rejection of claims 1-6 and 8-10.

PAGE 15/20 * RCVD AT 8/23/2005 7:26:59 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-6/27 * DNIS:2738300 * CSID:408 969 4849 * DURATION (mm-ss):04-50

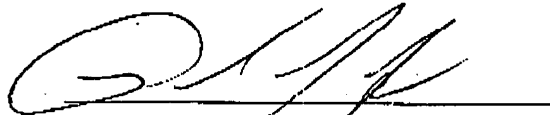
CONCLUSION

In view of these amendments and remarks, Applicants submit that this application is in condition for allowance. Reconsideration is respectfully requested. **If any objections or rejections remain, Applicants respectfully request an interview to discuss the references.** If the Examiner has any questions, she is asked to contact the undersigned agent at (408) 869-2921.

If there are any questions concerning this Response, the Examiner is invited to contact the undersigned agent at (408) 869-2921.

Dated: August 23, 2005

Respectfully submitted,



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PAGE 16/20 * RCVD AT 8/23/2005 7:26:59 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-6/27 * DNIS:2738300 * CSID:408 969 4849 * DURATION (mm-ss):04-50